DEVELOPMENT OF DISCRIMINANT MODEL FOR TABLE TENNIS PLAYERS ON THE BASIS OF PSYCHOLOGICAL VARIABLES

By

KAPI SONOWAL

A

SYNOPSIS

Submitted to:

RESEARCH DEVELOPMENT COMMITTEE

Lakshmibai National Institute of Physical Education, Gwalior

MAY, 2023

TABLE OF CONTENTS

(i) TITLE PAGE

(ii) TABLE OF CONTENTS

(iii) CHAPTER-I

a) Introduction
b) Statement of the problem
c) Delimitations
d) Definition and explanation of terms
e) Significance of the study

(iv) CHAPTER- II

Review of related literature

(v) CHAPTER- III

a) Selection of subjects
b) Criterion Measures
c) Administration of Test
d) Collection of Data
e) Statistical technique employed in study

(vi) BIBLIOGRAPHY

CHAPTER-I
INTRODUCTION

Table tennis, also known as ping pong, is a thrilling indoor sport enjoyed by millions of people around the world. It is a fast-paced game that requires quick reflexes, precise hand-eye coordination, and strategic thinking. The sport originated in the late 19th century as an after-dinner game in England and has since evolved into a highly competitive international sport.

Table tennis is played on a table divided into two halves by a net. Each player uses a small, lightweight paddle, also known as a racket, to hit a celluloid ball across the net. The objective is to score points by making the ball bounce on the opponent's side of the table in a way that it cannot be returned. Players engage in intense rallies, employing various techniques such as topspin, backspin, and sidespin to control the ball's trajectory and speed.

The game can be played in singles (one player against another) or doubles (two players on each side). It requires agility, speed, and agility, as players must swiftly move around the table to reach and return shots. Table tennis matches are often filled with incredible rallies, fast-paced exchanges, and strategic shots, making it an exciting and spectator-friendly sport.

Table tennis gained international recognition in the 20th century and became an Olympic sport in 1988. It is governed by the International Table Tennis Federation (ITTF), which organizes various competitions, including the World Table Tennis Championships and the Table Tennis World Cup. The sport has a dedicated following worldwide, particularly in China, where it enjoys immense popularity and has produced many dominant players. Beyond its competitive aspect, table tennis is also a popular recreational activity and is often played in homes, schools, and community centers. It is enjoyed by people of all ages and skill levels, providing a fun and engaging way to stay active and improve hand-eye coordination.

In table tennis, players can be categorized into different playing styles based on their approach to the game. Three common playing styles are attacking players, defensive players, and all-rounders. Let's explore each style in more detail:

Attacking Players:
Attacking players are known for their aggressive and offensive style of play. They focus on powerful shots, quick footwork, and relentless attacks to overwhelm their opponents. They actively seek opportunities to take the initiative in the rally and put pressure on their opponents through consistent attacking shots. Attacking players often employ techniques like topspin loops, smashes, and quick drives to dominate the game. They rely on their speed, precision, and shot selection to create openings and finish points decisively.

Defensive Players:
Defensive players, as the name suggests, prioritize defensive strategies and aim to frustrate their opponents by returning every shot with great control and consistency. They excel at blocking, chopping, and defensive strokes, often with heavy backspin, which makes it difficult for their opponents to attack effectively. Defensive players rely on their defensive skills, anticipation, and patience to wear down their opponents and force them into making errors. They prefer longer rallies, as it increases their chances of gaining an advantage. However, they can also transition into offensive shots when presented with the right opportunity.

All-Rounders:
All-rounders, as the name implies, possess a balanced approach to the game. They combine elements of both attacking and defensive styles, adapting their play based on the situation. All-rounders have a versatile skill set and can switch between offensive and defensive shots as needed. They have good control over the ball, consistent shot placement, and the ability to vary their shots. All-rounders excel in all aspects of the game, including attacking, defending, and counterattacking, making them adaptable and challenging opponents.

Table tennis places significant psychological demands on players, requiring mental strength and focus throughout the game. The sport requires intense concentration and

focus. Players must track the fast-moving ball, anticipate their opponent's shots, and make split-second decisions. Maintaining focus is crucial to react quickly and execute shots accurately, as even a momentary lapse in concentration can result in missed opportunities or errors. Mental toughness and resilience are vital in table tennis. Players must possess the ability to stay calm and composed, even in high-pressure situations. They need to bounce back from setbacks, such as losing a crucial point or making mistakes, and maintain a positive mindset. Mental toughness helps players stay resilient, recover quickly, and perform at their best even under challenging circumstances. Decision making plays a significant role in table tennis. Players must analyze their opponent's shots, assess the ball's trajectory, and choose the most effective shot to play. Quick decision making is crucial, as players have limited time to react and execute their shots. Good decision making involves evaluating options, anticipating the opponent's next move, and selecting the appropriate shot to gain an advantage in the rally.

Mental toughness is a crucial attribute in table tennis, as it enables players to perform optimally under pressure and overcome challenges. One aspect of mental toughness is emotional control. In the heat of intense matches, players need to manage their emotions effectively. They must avoid becoming overwhelmed by frustration, anger, or anxiety, as these emotions can hinder their focus and decision-making. Emotionally resilient players can stay composed, maintain their concentration, and make rational choices even in high-pressure situations.

Another requirement of mental toughness in table tennis is confidence and self-belief. Players with mental toughness have a strong belief in their abilities. They trust their training, skills, and strategies, which allows them to approach matches with a positive mindset. This confidence enables them to take calculated risks, make decisive shots, and maintain motivation and determination throughout the game. Believing in oneself also helps players bounce back from setbacks, as they maintain the belief that they can overcome challenges and perform at their best.

Resilience and adaptability are also essential components of mental toughness in table tennis. Resilient players are able to quickly recover from setbacks, mistakes, or losses. Rather than dwelling on past errors, they refocus on the present moment and adapt their

strategies accordingly. They make necessary adjustments to counter their opponents and continue to give their best effort despite adversity. Resilience enables players to maintain a competitive mindset and stay mentally engaged in the game. Focus and concentration are paramount in table tennis, and mental toughness is necessary to sustain them. The fast-paced nature of the sport demands players to track the ball, read their opponent's shots, and react swiftly. Mental toughness helps players stay focused and block out distractions, allowing them to maintain attention to detail. By remaining in the present moment, mentally tough players make quick decisions and execute shots accurately, giving them a competitive edge.

Furthermore, mental toughness involves having a positive mindset and a growth orientation. Rather than being discouraged by failures, mentally tough players view them as opportunities for growth. They adopt a solution-oriented approach and remain motivated to continuously improve their skills. This growth mindset helps them persevere through difficult situations, maintain long-term development, and make the most out of their table tennis journey. Developing mental toughness in table tennis requires practice, self-awareness, and mental training. Coaches and sports psychologists often play a vital role in helping players strengthen their mental resilience. Through techniques such as visualization, relaxation exercises, goal-setting, and positive self-talk, players can enhance their mental toughness and perform at their best on the table.

Anxiety can have a significant impact on table tennis performance. When players experience anxiety, their body's natural "fight or flight" response is activated, leading to physical and mental symptoms that can interfere with their ability to perform at their best. Common symptoms of anxiety in table tennis players include increased heart rate, sweating, trembling, and racing thoughts, all of which can distract from their focus and decision-making.

One way anxiety can affect table tennis performance is by disrupting players' attention and concentration. Anxiety can cause players to become overly self-conscious and self-critical, leading to doubts about their abilities and hesitation in making shots. This can also result in a lack of focus on the present moment and a preoccupation with future outcomes, leading to poor decision-making and ineffective shot selection. Another way

anxiety can impact table tennis performance is by affecting players' physical control and execution. The physical symptoms of anxiety, such as shaking hands or trembling legs, can interfere with players' ability to maintain proper form and execute shots accurately. This can result in missed shots or even injury if players push themselves too hard to compensate for their lack of control.

Furthermore, anxiety can also lead to a negative cycle of performance. If a player experiences anxiety during a match and performs poorly, it can reinforce their beliefs that they are not good enough or cannot handle pressure, leading to even more anxiety in future matches. This cycle can create a self-fulfilling prophecy, where anxiety and poor performance feed into each other, leading to a decline in overall confidence and enjoyment of the game. To mitigate the impact of anxiety on table tennis performance, players can implement various strategies, such as relaxation techniques, mental imagery, and goal-setting. These techniques can help players manage their anxiety, maintain their focus, and execute shots effectively. Seeking support from coaches, teammates, or sports psychologists can also be helpful in developing coping mechanisms and building mental resilience.

Motivation plays a crucial role in table tennis performance, as it drives players to pursue their goals, improve their skills, and perform at their best. Motivation can be divided into two main types: intrinsic motivation, which comes from within the individual, and extrinsic motivation, which comes from external factors such as rewards or recognition.

Intrinsic motivation is particularly important in table tennis as it involves the enjoyment and satisfaction derived from the sport itself. Players who are intrinsically motivated find pleasure in the game, the challenge of improving their skills, and the sense of accomplishment that comes from personal growth. They are driven by their love for the sport, the excitement of competition, and the fulfilment of pushing their limits. Intrinsic motivation fuels players' desire to train, practice, and invest time and effort into developing their table tennis abilities.

Extrinsic motivation can also have an impact on table tennis performance. External factors such as recognition, rewards, or the desire to please others can serve as motivators for players. For example, the prospect of winning a tournament, earning a

trophy, or receiving praise from coaches or peers can provide extrinsic motivation. While extrinsic motivation can be beneficial in driving players to achieve specific goals, it is essential for players to maintain a balance and not solely rely on external rewards, as this may lead to fluctuations in motivation when external factors are not present.

Motivation in table tennis is closely tied to goal-setting. Setting clear, challenging, and achievable goals helps players maintain focus, track their progress, and stay motivated throughout their training and competitive journey. Goals can be short-term (e.g., improving a specific technique) or long-term (e.g., reaching a certain ranking or participating in a prestigious tournament). The process of setting and pursuing goals provides players with a sense of purpose, direction, and motivation to continually strive for improvement. Additionally, the presence of a supportive and positive environment is crucial for fostering motivation in table tennis. Coaches, teammates, and family members who provide encouragement, guidance, and constructive feedback can significantly impact a player's motivation. A supportive network can help players overcome challenges, maintain a positive mindset, and foster a sense of belonging and camaraderie, which can contribute to their overall motivation and enjoyment of the sport.

Personality traits can significantly impact table tennis performance as they influence how players approach the sport, interact with others, and handle various challenges. While individual personalities vary, certain traits are commonly associated with successful table tennis players. One crucial personality trait for table tennis performance is competitiveness. Highly competitive individuals have a strong desire to win and excel in their performance. They thrive in competitive environments and are driven to outperform their opponents. Competitiveness fuels players' motivation to train harder, push their limits, and continuously strive for improvement. It also helps them maintain a focused and determined mindset during matches, allowing them to give their best effort and maximize their performance on the table.

Another important personality trait is resilience. Table tennis requires players to bounce back quickly from setbacks, adapt to changing situations, and maintain a positive mindset. Resilient players have the ability to cope with failures, setbacks, or losses and use them as learning experiences. They possess a strong belief in their abilities and can

recover mentally and emotionally, enabling them to stay focused, motivated, and engaged in the game. Resilience helps players persevere through challenging moments and maintain their performance under pressure. Additionally, discipline and self-discipline are essential traits for successful table tennis players. Discipline involves commitment to regular training, adherence to a structured practice regimen, and dedication to honing their skills. Self-discipline helps players maintain focus, resist distractions, and stay committed to their goals. It enables players to consistently put in the necessary effort, make sacrifices, and follow through on their training routines. Discipline and self-discipline contribute to the development of technical proficiency, consistency, and overall improvement in table tennis performance.

Furthermore, mental toughness is a valuable personality trait for table tennis players. Mental toughness encompasses several attributes, including emotional control, confidence, resilience, and the ability to handle pressure. Players with high levels of mental toughness can maintain focus and concentration, make effective decisions under pressure, and perform at their best even in challenging situations. They are able to manage stress, overcome adversity, and stay composed, allowing them to execute shots accurately and make strategic choices throughout a match. However, it is important to note that different personality traits can be advantageous in table tennis, and there is no one-size-fits-all formula for success. Each player's unique combination of personality traits contributes to their individual playing style and approach to the game. Understanding and leveraging one's personality traits can help players optimize their performance, develop strategies tailored to their strengths, and cultivate a positive and fulfilling experience in the sport.

Aggression can have both positive and negative effects on table tennis performance, depending on how it is expressed and controlled. Aggression in table tennis refers to the assertive and proactive approach that players take in their game, characterized by a strong desire to dominate the opponent and win points. Positive aggression can be beneficial to table tennis performance in several ways. Firstly, it can help players assert themselves on the table and create pressure for their opponents. Aggressive players often take the initiative in attacking shots, making powerful strokes, and putting their opponents on the defensive. This can disrupt the opponent's rhythm, force errors, and create scoring opportunities for the aggressive player. Secondly, aggression can

enhance players' mental state and confidence. Displaying a confident and assertive demeanour can intimidate opponents and boost self-assurance. It can help players believe in their abilities, take risks, and make bold decisions during matches. Aggression can instil a competitive mindset and a strong will to win, motivating players to give their maximum effort and perform at their best. However, it is important for players to control and channel aggression effectively. Uncontrolled or excessive aggression can lead to negative consequences in table tennis performance. Over-aggressiveness may result in rushed or careless shots, leading to unforced errors. It can also lead to impulsive decision-making, such as attempting difficult shots when more conservative options would be more effective.

In addition, excessive aggression can lead to loss of focus and discipline, as players may become overly emotional or frustrated when their aggressive tactics do not yield immediate success. To harness the benefits of aggression while avoiding its pitfalls, players must strike a balance. Developing strategic aggression involves understanding the game, recognizing opportunities for aggression, and executing aggressive shots at the appropriate times. This requires tactical awareness, good shot selection, and the ability to adapt to different opponents and match situations. Furthermore, it is crucial for players to maintain emotional control and composure when expressing aggression. Effective management of emotions allows players to stay focused, make sound decisions, and maintain consistency in their performance. It is important to direct aggression towards the game itself rather than personal interactions with opponents, as sportsmanship and fair play are essential in table tennis.

Players classified based on their playing style, such as aggressive players, defensive players, and all-round players, may exhibit distinct psychological differences that contribute to their approach to the game and overall performance.

Aggressive players tend to display high levels of confidence and assertiveness. They have a strong belief in their abilities and a competitive mindset that drives them to take risks and go on the offensive. These players often possess a strong desire to dominate the game and may exhibit a certain degree of competitiveness or aggression both on and off the table. Their psychological makeup allows them to maintain a focused and determined mindset, even in high-pressure situations, enabling them to execute

powerful shots and make bold decisions. Aggressive players thrive on the adrenaline and the thrill of taking control of the match, which can contribute to their success.

Defensive players, on the other hand, often exhibit exceptional patience, concentration, and mental resilience. They prioritize control, consistency, and precision in their play, which requires them to maintain a calm and composed demeanor. Defensive players need to read their opponents' shots accurately, anticipate their moves, and effectively retrieve and return shots. These players demonstrate a strong mental fortitude as they absorb the opponent's attacks and employ strategic defensive strokes. Their ability to maintain focus and composure under pressure allows them to frustrate opponents, forcing errors and capitalizing on opportunities. Defensive players rely on their mental discipline and resilience to outlast their opponents and win points through strategic play.

All-round players exhibit psychological adaptability and versatility. They possess a combination of offensive and defensive skills, allowing them to adjust their playing style based on the situation and opponent. These players demonstrate mental flexibility as they switch between offensive and defensive strategies seamlessly. They possess a strong tactical awareness, reading the game and making strategic decisions to exploit weaknesses in their opponents' play. All-round players require a high level of mental agility to adjust their game plan on the fly, effectively adapting to the changing dynamics of the match. Their psychological makeup allows them to strike a balance between aggression and defensive control, maximizing their versatility and adaptability on the table.

It's important to note that while these psychological differences exist among players with different playing styles, individual variations within each style are common. Each player possesses a unique psychological profile shaped by their personality, experiences, and training. Additionally, players may develop and refine their psychological traits over time, adapting to different opponents and refining their approach to the game.

Understanding the psychological differences in players based on their playing style can provide valuable insights for coaches and players themselves. It can guide the

development of tailored training strategies, enhance mental preparation, and help players optimize their performance by leveraging their inherent psychological strengths.

Statement of the problem

To develop a model that discriminate a group of table tennis player into offensive, defensive, and all rounder (playing style) through psychological variable.

Delimitation

1. The study delimited to only table tennis players.
2. The study delimited to state level players.
3. The study delimited to only age group between 16 to 25
4. The study delimited to only psychological variables predicting playing style:

- mental toughness
- anxiety
- motivation
- personality traits
- aggression

Definition and explanation of the term

Table tennis:

"Table tennis is a game of skill, speed, and strategy. It is played by two or four players who use small rackets to hit a lightweight ball back and forth across a table. The object of the game is to hit the ball so that it bounces on the opponent's side of the table and does not return. Table tennis is a fast-paced and exciting game that can be enjoyed by people of all ages and skill levels." (James E. Sullivan,1998).

Mental toughness:

"Mental toughness is the ability to control your emotions and stay calm under pressure." - Michael Jordan

Anxiety:

"An emotion characterized by feelings of tension, worried thoughts, and physical changes like increased blood pressure."- American Psychological Association (APA)

Motivation:

"A set of forces that compel or drive an individual to action."- Abraham Maslow

Personality traits:

Personality traits are relatively stable and enduring patterns of thought, feeling, and behaviour that are characteristic of an individual**.**

Aggression:

“As behavior that is intended to harm another individual who does not wish to be harmed” -(Baron and Richardson,1994).

Significance of the study

The study will be significant in following ways:

1. The study will help to provide knowledge to identify the psychological variables required for discriminating between various playing style.

2. The study will help us to identify the factors that are most likely to predict which group a player belongs to. This information could be useful for a variety of purposes, such as developing targeted interventions or designing new research studies.

3. The study will help coaches and players to choose training methods according to their playing styles.

4. The study will help us to identify the specific skills and strategies that are most important for each playing style.

5. The obtained information will be used to develop training programs that help paddlers to improve their skills and reach their full potential.

6. The study will help players to understand what kind of playing style is most compatible with their personality, motivation, and other psychological factors.

7. The study will help a coach to select players by considering their psychological characteristics.

CHAPTER- II
REVIEW OF RELATED LITERATURE

Sapna Mandoli(2020)) :Cricket is a game of grace and beauty which is based on technical skill, which require years of practice for being mastered in particular skill, which requires more and more concentration and patience with higher degree of fitness. Nowadays the game of cricket is tremendously changing with introducing of new cricket format like t- 20 because of this the role of specialty (playing position) becomes a measure issue for a player. It has been observed most of the time that childrens who play cricket or want to join cricket as a career are more passionate to become a batsman rather than a bowler though they have a potential to be a good bowler. Hence on the basis of their morphological as well as physiological characteristics they can be classifying in to different categories according to their playing specialty. So, for the talent identification purpose it is important to identify the predicting factors at the early age for the cricketers so they can classify according to their speciality i.e. batsmen, pace bowlers and spinners. For this a discriminant model was developed by the researcher and the prime objective of the study was to discriminant the selected physiological and anthropometric variables for classifying cricketers in to one of the three categories i.e. (batsmen, pace bowlers and spinners) and for the following research issues which are quoted below. Whether on the basis of selected variables the subjects could be classified in to one of the three groups. Which variables have most discriminating power among all the variables which were selected in the study. For the purpose of present study, total 90 senior s women cricket players wereselected from the six state boards i.e. Madhya Pradesh, Delhi, Uttarakhand, Uttar Pradesh, Himachal Pradesh and Haryana by using convenient purposive Sampling technique. The subjects were having match experience of at least three years professionally at elite level. Further the subjects were divided in to three groups (Batsmen N = 30, Spinners N = 30 and Pace - Bowlers N = 3

Amritashish Bagchi(2016): This study was undertaken to develop a discriminant model for classifying cricketers based on selected anthropometric and physical variables.Methods: The sample was composed of 140 male cricketers (age: 24 ± 3.2) classified in two different groups (i.e. Batsmen n = 70 & Pace – Bowlers n = 70). A total of twelve variables (5 Anthropometric & 7 Physical Variables) were selected for the study.Results:The developed discriminant model for Batsmen & Pace – Bowlers have high log determinants. The developed discriminant function explains 53.14 % of

the variation in the dependent variable by the discriminant model. The classification matrices developed by the model shows that overall 82.1 % of samples were correctly classified. Conclusion:The findings from this study indicate that pace – bowlers were found to be taller, have higher shoulder explosive strength and back strength than batsmen. Pace – bowlers require a higher level of fitness than batsmen. The effort that they put on a single delivery requires a higher level of strength in shoulder, leg and back muscles. Left-hand grip strength was much higher in batsmen than pace – bowlers; this may be due to the nature of the game as the top hand (left hand) is more dominating in batting (especially in vertical grounded strokes) than the bottom hand (right hand).

Nandkishor Pawari(2018): The aim of the study was to identify anthropometric variables that discriminate the male volleyball players according to different playing positions i.e., libero (n=16), setter (n=16), and middle blocker (n=20). The anthropometric variables included Standing height, Body weight, Arm length, Wrist circumference, Palm width, Thigh circumference, Calf circumference and Leg length. Multiple Discriminant functions revealed five significant function. ($p<0.05$)i.e. height, weight, arm length, thigh circumference, wrist circumference, which primarily represented in different playing positions. After validation, the analysis showed that 90.4% of players were correctly classified in their respective playing positions.

Ranjit singh Rawat(2019): The purpose of the study was to analysis different playing positions and age categories with selected functional, anthropometric and handball skill test. It is very difficult for coaches and Physical education teacher to identify the players talent and selecting for pre defined positions in particular game Hence, through these models greater understanding for selections of players according to their positions will directly helps the Physical education teacher and coaches to select and identify the talent of individuals in sports and game. The research will strengthen the knowledge of how to understand the statistical tools regarding Discriminant analysis in details, as young researcher will also able and understand the interpretations of the results which will broader the idea to solve the upcoming gap of knowledge in various sportsand game research. This research consists of the study in which subject, statistical tools, limitation, de limitations, importance and formulating of hypothesis is been discussed. It consists of various review literature relatedto the previous study. The methodology applied in the study like selection of variables and selections of tests and their administrations with their procedure, instrument used in the test and statistical tools which was used. Chapter number 4 consists of analysis of the data with their interpretations of the results and discussion of findings and hypothesis. In this study multi discriminant analysis was used to discriminate the

variables to predict in different groups and levels. This study will helps and guide others researcher to understand the concepts of playing positions and how to apply and interpret the results. At each and every step, care has been taken to present the study in such a way that young researcher,coaches and physical education teacher will be benefit out of it.

Harsanyi(1992) In identification and improvement of talent for athletics, training practice is hindered by considerable errors of estimation. Sports sciences must wrestle with the problem of lack of an established theory to guide the search for talented people. Nevertheless, a theoretically and practically effective system was used in the former German Democratic Republic for 15 years. The existing elements of this system were integrated with pedagogical experience and other data from the literature in an attempt to outline a system to be used in athletics in the search for talented performers. In this novel concept the main means of identification of athletic talent is competition itself, the main indicator is competitive performance, and the most important stimulator of interest in a discipline is success in competition. Competitive performances, however, can be of prognostic value only if they are evaluated together with the factors of trainability, biological age, training age and and psychobiological, physiological, anthropometrical and social characteristics.

Justin keogh(1999) This study was conducted to determine if anthropometric and fitness testing scores can be used to discriminate between players that were selected or not selected in an elite Under 18 Australian Rules Football side. A training squad of 40 Australian Rules Football players was assessed on a battery of standard anthropometric and fitness tests just prior to the selection of the 30 man player roster for the upcoming season. Results showed that the selected players were significantly ($P < 0.05$) taller and had greater upper body strength than non-selected players. A discriminant analysis was performed which predicted with an accuracy of 80% whether each player was successful or unsuccessful in gaining selection. This suggested that physical conditioning and anthropometric measurements do play an important part in determining selection in elite junior Australian Rules Football teams. However the discriminant function predicted non-selected players (90.9%) better than it predicted selected players (75.9%). Selected Under 18 players were found to be similar to the values reported for elite to sub-elite senior players on height, sit and reach, CMJ and perhaps aerobic fitness, but considerably less than the senior players on 3RM bench press and body mass.

D.G.Hoare(2000) This study used a quasi-applied research model to identify and develop potentially talented female soccer players. Athletes aged 15–19 years with a background in team ball sports or athletics were targeted for recruitment using advertisements and promotions through various media. Interested athletes attended a 2-day programme of testing, which included assessment of anthropometric, physiological and skill attributes. A combination of factors was used in the final selection of 17 athletes to take part in a 12-month talent development programme. A pre-season programme of five training sessions per week was conducted for 2 months. This programme focused on enabling the players to acquire the necessary ball and game skills to perform competitively in a short time. The squad competed as a team in the reserve grade competition of an Australian state league. At the conclusion of the 25-game season, 10 players were selected for zone teams with two players progressing to state team selection within 6 months. The project demonstrates that it is possible to select potential female soccer players based on anthropometric, physiological and skill attributes.Selection procedures could be enhanced through the development of objective assessment tools that measure tactical and technical competence. Programmes such as this can offer an additional avenue of player recruitment in support of existing procedures.

T Morris(2000) Research on psychological characteristics and sports performance and examine the literature on talent identification with particular reference to soccer to derive implications for the use of psychological variables in the talent identification and development process. Although the many cross-sectional studies of psychological characteristics and performance in all football codes conducted over the last 30 years have revealed no clear patterns, studies of both general inventories and specific variables are still being conducted. Reports on talent identification in all codes have increased in recent years, but most are descriptive in nature. In this review, I suggest that research on systematic expert observation has potential as a practical approach, but more studies of this type are needed. Considering the examination of specific psychological variables, only a solitary investigation of creativity in adolescents has shown promise. Further research on creativity and talent identification is required to replicate the positive results found in that study. In summarizing the research on psychological characteristics and talent identification, I conclude that cross-sectional research on adults cannot be extrapolated for use in talent identification with adolescents. I propose that resources would be more effectively used in the provision of psychological skills training for adolescent soccer players, pending more sophisticated research on a wider range of psychological variables. It is recommended

that longitudinal or quasi-longitudinal research is essential to determine whether the same psychological variables are important for outstanding performance throughout the process of development and whether psychological variables measured during adolescence can predict outstanding performance in adulthood.

C.F. Nieuwenhuis (2002) The object of this study was to identify kinanthropometric, motor-physical and psychological variables and specific field hockey skills that influence field hockey performance at the age of 14 to 15 years. The two top girls' field hockey teams in the North West Province (South Africa) U/15 (under 15 age group) field hockey league (n = 27), as well as the two teams who ended at the bottom of the league (n = 25), were exposed to a test battery. The 52 subjects were classified according to their league results as successful and less successful. The test battery consisted of nine field hockey skills tests, 16 kinanthropometric tests and six physical-motor abil ity tests and two sport psychological tests. A statistical analysis of the data was done for descriptive purposes and statistical significances between the successful and less successful players were determined. Results indicated meaningful differences in some variables. A prediction function was therefore developed consisting of eight variables that successfully distinguished between successful and less successful 14- to 15-year-old female field hockey players.

Justin keogh(2003) The purpose of the present study was to develop an effective testing battery for female field hockey by using anthropometric, physiological, and skill-related tests to distinguish between regional representative (Rep, n = 35) and local club level (Club, n = 39) female field hockey players. Rep players were significantly leaner and recorded faster times for the 10-m and 40-m sprints as well as the Illinois Agility Run (with and without dribbling a hockey ball). Rep players also had greater aerobic and lower body muscular power and were more accurate in the shooting accuracy test, $p < 0.05$. No significant differences between groups were evident for height, body mass, speed decrement in 6 × 40-m repeated sprints, handgrip strength, or pushing speed. These results indicate that %BF, sprinting speed, agility, dribbling control, aerobic and muscular power, and shooting accuracy can distinguish between female field hockey players of varying standards. Therefore talent identification programs for female field hockey should include assessments of these physical parameters. Key words: fitness profile, field testing, women, team sport.

Paul ward and Mark william(2003) This study examined the relative contribution of visual, perceptual, and cognitive skills to the development of expertise in soccer. Elite and sub-elite players, ranging in age from 9 to 17 years, were assessed using a multidimensional battery of tests. Four aspects of visual function were measured: static and dynamic visual acuity; stereoscopic depth sensitivity; and peripheral awareness. Perceptual and cognitive skills were assessed via the use of situational probabilities, as well as tests of anticipation and memory recall. Stepwise discriminant analyses revealed that the tests of visual function did not consistently discriminate between skill groups at any age. Tests of anticipatory performance and use of situational probabilities were the best in discriminating across skill groups. Memory recall of structured patterns of play was most predictive of age. As early as age 9, elite soccer players demonstrated superior perceptual and cognitive skills when compared to their sub-elite counterparts. Implications for training perceptual and cognitive skill in sport are discussed.

Falk et .al.(2004) The processes of talent detection and early development are critical in any sport programme. However, not much is known about the appropriate strategies to be implemented during these processes, and little scientific inquiry has been conducted in this area. The aim of this study was to identify variables of swimming, ball handling and physical ability, as well as game intelligence, which could assist in the selection process of young water-polo players. Twenty-four players aged 14–15 years underwent a battery of tests three times during a 2-year period, before selection to the junior national team. The tests included: freestyle swim for 50, 100, 200 and 400 m, 100-m breast-stroke, 100-m 'butterfly' (with breast-stroke leg motion), 50-m dribbling, throwing at the goal, throw for distance in the water, vertical 'jump' from the water, and evaluation of game intelligence by two coaches. A comparison of those players eventually selected to the team and those not selected demonstrated that, 2 years before selection, selected players were already superior on most of the swim tasks (with the exception of breast-stroke and 50-m freestyle), as well as dribbling and game intelligence. This superiority was maintained throughout the 2 years. Two-way tabulation revealed that, based on baseline scores, the prediction for 67% of the players was in agreement with the final selection to the junior national team. We recommend that fewer swim events be used in the process of selecting young water-polo players, and that greater emphasis should be placed on evaluation of game intelligence.

M.J.Ducan and woodfield(2006) To investigate the anthropometric and physiological characteristics of junior elite volleyball players.Method: Twenty five national level

volleyball players (mean (SD) age 17.5 (0.5) years) were assessed on a number of physiological and anthropometric variables. Somatotype was assessed using the Heath-Carter method, body composition (% body fat, % muscle mass) was assessed using surface anthropometry, leg strength was assessed using a leg and back dynamometer, low back and hamstring flexibility was assessed using the sit and reach test, and the vertical jump was used as a measure of lower body power. Maximal oxygen uptake was predicted using the 20 m multistage fitness test.Results: Setters were more ectomorphic ($p<0.05$) and less mesomorphic ($p<0.01$) than centres. Mean (SD) of somatotype (endomorphy, mesomorphy, ectomorphy) for setters and centres was 2.6 (0.9), 1.9 (1.1), 5.3 (1.2) and 2.2 (0.8), 3.9 (1.1), 3.6 (0.7) respectively. Hitters had significantly greater low back and hamstring flexibility than opposites. Mean (SD) for sit and reach was 19.3 (8.3) cm for opposites and 37 (10.7) cm for hitters. There were no other significant differences in physiological and anthropometric variables across playing positions (all $p>0.05$).Conclusion: Setters tend to be endomorphic ectomorphs, hitters and opposites tend to be balanced ectomorphs, whereas centres tend to be ectomorphic mesomorphs. These results indicate the need for sports scientists and conditioning professionals to take the body type of volleyball players into account when designing individualised position specific training programmes.

R.Vaeyens et.al.(2006) To determine the relationships between physical and performance characteristics and level of skill in youth soccer players aged 12–16 years. Methods: Anthropometry, maturity status, functional and sport-specific parameters were assessed in elite, sub-elite, and non-elite youth players in four age groups: U13 (n=117), U14 (n=136), U15 (n=138) and U16 (n=99). Results: Multivariate analyses of covariance by age group with maturity status as the covariate showed that elite players scored better than the non-elite players on strength, flexibility, speed, aerobic endurance, anaerobic capacity and several technical skills ($p<0.05$). Stepwise discriminant analyses showed that running speed and technical skills were the most important characteristics in U13 and U14 players, while cardiorespiratory endurance was more important in U15 and U16 players. The results suggest that discriminating characteristics change with competitive age levels. Conclusions: Characteristics that discriminate youth soccer players vary by age group. Talent identification models should thus be dynamic and provide opportunities for changing parameters in a long-term developmental context.

Pearson et. al.(2006) Entrepreneurial marketing of sport increases demands on sport development officers to identify talented individuals for specialist development at the youngest possible age. Talent identification results in the streamlining of resources to produce optimal returns from a sports investment. However, the process of talent identification for team sports is complex and success prediction is imperfect. The aim of this review is to describe existing practices in physiological tests used for talent identification in team sports and discuss the impact of maturity-related differences on the long term outcomes particularly for male participants.Maturation is a major confounding variable in talent identification during adolescence. A myriad of hormonal changes during puberty results in physical and physiological characteristics important for sporting performance. Significant changes during puberty make the prediction of adult performance difficult from adolescent data. Furthermore, for talent identification programs to succeed, valid and reliable testing procedures must be accepted and implemented in a range of performance-related categories. Limited success in scientifically based talent identification is evident in a range of team sports. Genetic advances challenge the ethics of talent identification in adolescent sport. However, the environment remains a significant component of success prediction in sport. Considerations for supporting talented young male athletes are discussed.

CHAPTER- III
METHODOLOGY

Conducting research involves a deliberate, focused, and systematic process that requires adopting appropriate measures to obtain essential data. The selection of the research problem's definition and limitations is crucial before deciding on the appropriate method and procedure to be used. The selection of the approach must be carefully considered, taking into account the study's objectives, time limitations, subject availability, and the resources available to the researcher. This chapter outlines the steps involved in conducting a research study, including subject and variable selection, test administration, and statistical analysis of the data.

Selection of subjects

The selection of subjects is a crucial step in any research study, and it requires careful consideration. For this particular study, 90 subjects will be selected from who have participated in the state level table tennis tournament. The selection will include offensive, defensive, and all-rounder players to ensure a diverse representation of the playing styles.

Selection of variables

Criterion variable:

- Gender
- Playing style

Independent variables

1. Mental toughness
2. Anxiety
3. Motivation
4. personality traits
5. aggression

Criterion Measures

S.No	Variable	Tool
1	Mental toughness	Sports mental toughness questionnaire (Michael Sheard, Jim Gobly, Anna van Wersch 2009)
2	Anxiety	Sports competition anxiety test(SCAT)(Martens and colleagues 1977)
3	Motivation	sports motivation scale(SMS-28)(Luc G Pelletier, Michelle Fortier, Robert J. Vallerand, Nathalie M.Briere,Kim M. Tuson and Marc R. Blais, 1995)
4	Personality trait	The five big personality test (Lewis Goldberg1949)
5	Aggression	Aggression questionnaire (Buss and Perry1992)

Administration of test

Self-report questionnaire will be completed by participants online at google form and offline. The participants will be informed that participation is anonymous and confidential. In addition, a consent form will be provided to the selected subjects, outlining the study's purpose, procedures, and potential risks and benefits. The confidentiality and privacy of the participants will be ensured throughout the study.

Collection of data

Data will be collected through self-reported questionnaire in online mode with the help of google form and offline mode.

Statistical analysis

Descriptive statistics will be used for describing the data and comparing theprofile of paddlers in different playing styles.

Multiple discriminant analysis will be used to classify an individual into one of the three groups on the basis of predictor variables.

References

T. Morris (2000) Psychological characteristics and talent identification in soccer, Journal of Sports Sciences, 18:9, 715-726, DOI: 10.1080/02640410050120096

Nieuwenhuis, C. W., Spamer, E. J., & van Rossum, J. H. A. (2002). A prediction function for identifying talent in 14- to 15-year old female field hockey players. High Ability Studies, 13(1), 21-33. https://doi.org/10.1080/13598130220132280

Marchese, F.; Malagoli Lanzoni, I.; Steca, P. Personality Traits and Motives in Table Tennis Players. Int. J. Environ. Res. Public Health 2022, 19, 10715. https://doi.org/10.3390/ ijerph191710715

González-García, H., & Martinent, G. (2020). Perceived anger profiles in table tennis players: 1 Relationship with burnout and coping. Psychology of Sport and Exercise, 50, 101743. 2 doi:10.1016/j.psychsport.2020.101743

The influence of the family in the development of talent in sport**.***Sport Psychol.* 1999; **13**: 395-417

Dana, K., Webster, Z., Andre, A. L. (2014). Anthropometric and Physical Fitness Characteristics of Male Cricket Players at the University of the Western Cape. Journal of Community and Health Sciences, 9(1), 1-7.

Gabbett, T., Georgieff, B., & Domrow, N. (2007) The Use of Physiological, Anthropometric, Skill Data to Predict Selection in A Talent- Identified Junior Volleyball Squad. Journal of Sports and Sciences, 25 (12), 1337-1344

Kumar, N., & Rajan, R. (2014). Relationship of Selected Physical, Physiological and Anthropometric Variables with Playing Ability among Boys Mini National Volleyballers. International Journal of Scientific Research. 3(9), 436-437

Anshel, Mark H.; Lidor,Ronnie. (2012) Talent Detection Programs in Sport: The Questionable Use of Psychological Measures. Journal of Sport Behavior. Vol. 35 Issue 3, p239-266. 28p

Coelho e Silva, M., Figueiredo, A., Simões, F., Seabra, A., Natal, A., &Vaeyens, R. et al.(2010). Discrimination of U-14 Soccer Players by Level and Position. International Journal of Sports Medicine, 31(11), 790-796. doi: 10.1055/s0030-1263139

Cselkó, A., László, Z., Tékus, É, & Wilhelm, M. (2013).Anthropometric and cardiovascular. characteristics of young elite male handball players according to playing positions. Exercise and Quality of Life, 5(1), 31-41. doi:

10.5937/exquli1301031c

Gil, S., Gil, J., Ruiz, F., Irazusta, A., & Irazusta, J. (2007). Physiological and Anthropometric Characteristics of Young Soccer Players According to Their Playing Position: Relevance for the Selection Process. The Journal Of Strength And Conditioning Research, 21(2), 438. doi: 10.1519/r-199951

Spamer, E. (2009). Talent identification and development in youth rugby players: a research review. South African Journal For Research In Sport, Physical Education And Recreation, 31(2). doi: 10.4314/sajrs.v31i2.46332